

1 We claim:

2 1. A semi-permanent reference electrode for use in field applications, said semi-
3 permanent reference electrode being associated with a working electrode to form a cell,
4 said semi-permanent reference electrode and said working electrode being used in a
5 system with a voltmeter, said voltmeter used to measure the potential difference
6 between said working electrode and said semi-permanent reference electrode, and a
7 power supply, said power supply being used to supply a potential to said working
8 electrode, said semi-permanent reference electrode comprising: an electrode body
9 forming an electrode internal chamber; a fill solution contained within said
10 electrode internal chamber, said fill solution being a saturated salt solution with a
11 constant pH formed from a solid salt, wherein said solid salt is hygroscopic and has
12 a low deliquescence point; and a wire situated within said electrode internal
13 chamber for making contact with said fill solution;
14 wherein said fill solution does not dry in field applications because said fill solution
15 can draw moisture from the environment to maintain itself in solution.

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17 2. The semi-permanent reference electrode of Claim 1, further comprising a cap
18 removably situated within said electrode internal chamber.

- 1 3. The semi-permanent reference electrode of Claim 2, further comprising a porous
2 plug removably situated within said electrode internal chamber.
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- 4 4. The semi-permanent reference electrode of Claim 3, wherein said solid salt is
5 hydrolyzable.
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- 7 5. The semi-permanent reference electrode of Claim 4 wherein said cap further
8 comprises an opening for passage of moisture from the environment into said
9 electrode internal chamber.
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- 11 6. The semi-permanent reference electrode of Claim 5 wherein said wire
12 maintains a relatively stable reference point with a low rate of corrosion.
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- 14 7. The semi-permanent reference electrode of Claim 6 wherein said wire is an
15 oxidized metal.
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- 17 8. The semi-permanent reference electrode of Claim 7 wherein said solid salt is
18 selected from the group consisting of magnesium salt, calcium salt, zinc salt and iron
19 salt.
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1 9. The semi-permanent reference electrode of Claim 8 wherein said solid salt is
2 magnesium chloride or sodium magnesium acetate.

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4 10. The semi-permanent reference electrode of Claim 9 wherein said
5 electrode body is formed from an inert material.

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7 11. The semi-permanent reference electrode of Claim 7 wherein said wire is formed
8 from oxidized tungsten or oxidized iridium.

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10 12. A method of using the semi-permanent reference electrode of Claim 1 for
11 measuring corrosion potential of a metallic object such as a pipeline, storage tank or
12 bridge in a system utilizing a voltmeter, wherein said method comprises: placing
13 said semi-permanent reference electrode directly above said metallic object; first
14 connecting said semi-permanent reference electrode to said voltmeter; second
15 connecting said voltmeter to said metallic object; and measuring the potential
16 difference between said metallic object and said semipermanent reference electrode
17 to determine the corrosion potential of the metallic object.

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19 13. The method of Claim 12 wherein said solid salt is hydrolyzable.

1 14. The method of Claim 13 wherein said solid salt is selected from the
2 group consisting of magnesium salt, calcium salt, zinc salt, and iron salt.
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4 15. A method of using the semi-permanent reference electrode of Claim 1 for
5 measuring potential of a cathodically protected metallic object such as a pipeline,
6 storage tank or bridge in a system utilizing a voltmeter, wherein said method
7 comprises the steps of:
8 producing a current flow onto said metallic object for cathodic protection to form
9 a cathodically protected metallic object;
10 placing said semi-permanent reference electrode directly above said cathodically
11 protected metallic object;
12 first connecting said semi-permanent reference electrode to said voltmeter;
13 second connecting said voltmeter to said cathodically protected metallic object; and
14 measuring the potential difference between said cathodically protected metallic
15 object and said semi-permanent reference electrode to determine whether full
16 cathodic protection for said metallic object has been obtained.
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18 16. The method of Claim 15 wherein said solid salt is hydrolyzable.

1 17. The method of Claim 16 wherein said solid salt is selected from the group
2 consisting of magnesium salt, calcium salt, zinc salt, and iron salt.

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